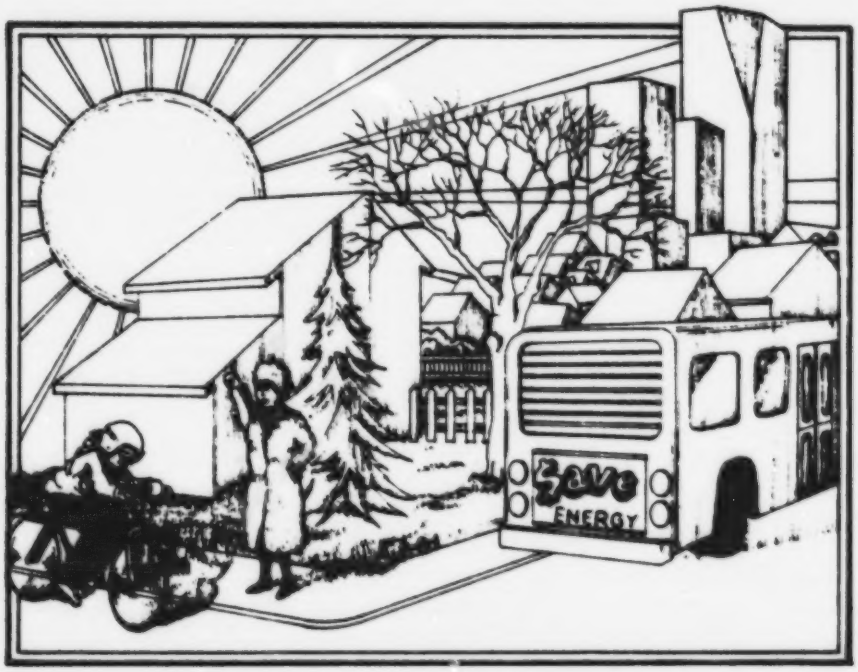
Energy Efficient Community Development
- Interim Report -

RESPONSE TO SUBMITTED BRIEFS
AND
REVISED ENERGY CONSERVATION MEASURES



City of Regina Planning Department

MARCH 1986

ENERGY EFFICIENT COMMUNITY DEVELOPMENT
INTERIM REPORT NO. 2:

Response to Submitted Briefs
and Revised Energy Conservation Measures

CONTENTS

Page

1. INTRODUCTION

1.1 Purpose 1
1.2 Submitted Briefs 1

2. MAJOR COMMENTS

2.1 General Approach 3
2.2 Compact Urban Form 6
2.3 Modal Choice 13
2.4 Solar Access 15

3. REVISIONS TO "THE OPPORTUNITIES FOR CONSERVING ENERGY"

3.1 Revisions 16
3.2 Application to the Planning Process 17

APPENDIX "A": COMPLETE TEXT OF BRIEFS SUBMITTED 18

APPENDIX "B": REVISED ENERGY CONSERVATION MEASURES 39

1.0 INTRODUCTION

On October 15, 1985 the Regina Planning Commission tabled for public review and comment a document entitled "The Opportunities for Conserving Energy". This was the first interim report of a study of Energy Efficient Community Development which was authorized by the Regina Planning Commission and City Council on March 4, 1985.

1.1 Purpose

The purpose of this second interim report is to present the comments which have been received in response to the review, and to indicate how energy conservation measures which reflect the comments received will be used in the ongoing planning process.

1.2 Submitted Briefs

Copies of "The Opportunities for conserving Energy" were sent to the following organizations:

- Regina Home Builders' Association (HUDAC)
- Building Owners and Manager's Association
- Regina Chamber of Commerce
- American Society of Heating, Refrigeration and Air Conditioning Engineers
- Saskatchewan Association of Architects
- Association of Professional Engineers of Saskatchewan
- Saskatchewan Construction Association
- Regina Real Estate Association
- Community Planning Association of Canada (CPAC)
- Solar Energy Society of Canada
- Association of Professional Community Planners of Saskatchewan.

- Saskatchewan Power Corporation
- Independent Petroleum Association of Canada
- All 26 Community Associations
- Regina's Market Square
- Regina Public Works and Engineering Department
- Regina Parks and Recreation Department
- Regina Buildings and Properties Department
- Regina Rail Relocation Office
- Regina Transit Department
- Energy Mines and Resources Canada
- Saskatchewan Department of Energy and Mines

Written briefs were submitted by:

- Glencairn Community Association
- Core Community Association
- Uplands Community Association
- Northeast Community Association
- Regina's Market Square
- Regina Home Builders' Association (HUDAC)
- Community Planning Association of Canada (CPAC)
- Public Works and Engineering Department
- Buildings and Properties Department
- Rail Relocation Office
- Parks and Recreation Department
- Saskatchewan Energy and Mines

Copies of the complete text of their submissions are included in this report as Appendix 'A'. The remainder of this report will summarize the major comments which were made, and indicate the Planning Department's response to them.

2.0 MAJOR COMMENTS

The comments reflected a general support for the measures presented in "The Opportunities for Conserving Energy" to address future development. Four areas of concern were raised in one or more of the submissions; these relate to the general approach taken, encouraging a more compact urban form, modal choice, and solar access.

2.1 GENERAL APPROACH

Comments were made regarding the general approach taken to promote energy conservation.

Market Factors:

There were several comments regarding market acceptance of energy efficient development.

HUDAC noted that the market dictates the speed at which new innovations can be introduced, and that public demand for super energy efficient housing has declined with alleviation of the "energy crunch" that was experienced in past years. However, the initial crunch did force their industry into responding to consumer demand by providing energy efficient housing.

The Public Works and Engineering Department, Uplands Community Association, and CPAC note that public demand is a significant factor, and that trade-offs often exist between energy and other issues. It is necessary to balance these trade-offs in terms of public support for energy conservation.

The Uplands Community Association suggests that emphasis be placed on public education, to foster support for energy conservation.

In response to the above comments, the Planning Department recognizes the importance of market factors, and will most strongly pursue those measures which do not encumber the marketability of housing, but which may in fact enhance their marketability. Particular difficulty exists in increasing density, which can adversely affect the marketability of housing in Regina if care is not taken to ensure that the desired amenities of housing type/lot size, and open space are retained. Section 2.2 will discuss the density issue in more detail.

Energy is declining as a "crisis" and is therefore less prominent on the public agenda. Nevertheless, energy costs are now higher in real terms than they were at the height of the "crisis", and they will generally continue to rise in the future. Good household economic management requires that energy costs be taken into consideration when decisions on housing purchases are made. An educated sector of the market is demanding well insulated and sealed houses in order to significantly reduce their heating costs. It is worthwile to consider a program of public information brochures outlining energy benefits of the measures introduced in this study. Special recognition for new subdivisions via an "energy efficiency seal of approval" given by the City when its energy guidelines are met, can be used as a marketing "plus".

It should also be noted that almost invariably, the energy measures are consistent with and support other planning objectives. Energy wasted transportation is a reflection of inefficiency and inconvenience - too long trips, facilities too far to walk, long circuitous bus routes, traffic being routed at slow speeds through neighbourhoods. Most of the measures prescribed in the report reflect initiatives which have already been taken to some extent, for reasons independent of energy considerations.

Benefit/Cost Analysis:

The principal reason for circulating "The Opportunities for Conserving Energy" for comment was to gain information and views which would aid in evaluating the measures for conserving energy which were discussed in the report. The approach of undertaking a benefit/cost evaluation was raised by CPAC, the Uplands Community Association, and the Public Works and Engineering Department. They caution that care should be exercised in evaluating the costs and benefits, especially as they relate to the specific Regina context. CPAC notes that little information exists on the benefit/cost of energy conservation measures, thus making research difficult.

In response to the above, the Planning Department agrees that detailed examination of the benefit/cost of each measure will be very difficult to carry out. However, such detailed analysis is only necessary where apparent conflicts exist. At this time, the measures which do not incur significant costs can be put into place, and a detailed review of the more costly measures should be undertaken when consideration is being given to their implementation. The measures potentially falling into the latter category are those discussed in more detail in the subsequent sections of this report.

2.2 COMPACT URBAN FORM

Energy used in travel can potentially be reduced by decreasing the distances between origins and destinations through the establishment of a compact urban form. This implies a higher overall density of development and an organization of growth patterns to reduce sprawl. Comments were made regarding these issues as follows:

Open Space Dedication:

The suggestion that public reserve dedication be taken as cash-in-lieu where the dedication of land would be surplus to the open space needs of the area prompted several comments.

The Regina Parks and Recreation Department noted that the issue is being examined in the Open Space Management Plan which they are now conducting. One possible conclusion of that study is that there is sometimes too much neighbourhood open space being dedicated, and that it would be better to bank land for community and zone level parks.

Both the Uplands and Glencairn Community Associations expressed concern that there be sufficient open space in new neighbourhoods, and residents not feel "boxed in".

The Regina Public Works and Engineering Department noted that reduced open space also reduces the amount of energy consumed in maintenance, especially treating and pumping water for irrigation.

In response to the above comments, the Planning Department believes that questions of open space dedication will be decided on the basis of many factors; first and foremost being the recreational and aesthetic needs of the residents for whom the park area is intended. The energy/density benefits of reducing the amount of open space can be alternately achieved by considering the location and distribution of open space in an area, while maintaining the total area of land dedicated.

Implied in this is an emphasis on providing large zone or community level parks, rather than relying on a multitude of neighbourhood parks scattered throughout an area.

Road Dedication:

The proposal to minimize the amount of land dedicated to roads elicited comments from Public Works and Engineering, Parks and Recreation, and HUDAC.

Both City departments urged that rights-of-way widths not be further reduced. Public Works and Engineering stated that the widths now dedicated are at a minimum, and the Parks and Recreation Department is reluctant to continue the practice of substituting tree planting easements for City owned boulevards, which was initiated under the PUD process in several newer subdivisions.

HUDAC is amenable to pursuing reduced road widths and deleting sidewalks on one or both sides of local streets (culs-de-sac, short crescents, etc.)

The Planning Department believes that in view of the difficulties which would appear to be encountered in further reducing road widths, it not be pursued at this time. However, the present standards for rights-of-way widths should not be increased without full consideration being given to the impact it may have on density and energy use.

The amount of land dedicated to roads can, however, be reduced by careful design of subdivisions to minimize road lengths, and to place emphasis on more short, low volume local streets which are generally 15m in width, while de-emphasizing long, higher volume collector streets which may require 18m widths.

Infill Development and Housing Conversions:

In response to the fact that older neighbourhoods in the city are declining in population (including virtually all areas developed before the mid 1970's), "The Opportunities for Conserving Energy" report suggests that efforts be made to stimulate new infill housing development and conversions in these areas, to halt this slide in density. Comments were received from the Core Community Association, Glencairn Community Association, and the Regina Parks and Recreation Department.

The two community associations as cited above support infill development at higher densities in the central area of the city. However, Core notes that there is not much interest in infill development from the private sector, and the Saskatchewan Housing Corporation is not proceeding with its infill program. The vacated rail yards appear to be a good opportunity for infill if "high density slum planning" can be avoided. They are also concerned that houses which have been converted to apartments or rooms do not always represent a positive development in their area.

The Parks and Recreation Department notes that care should be taken to ensure that the additional population resulting from infill activities has adequate recreational facilities.

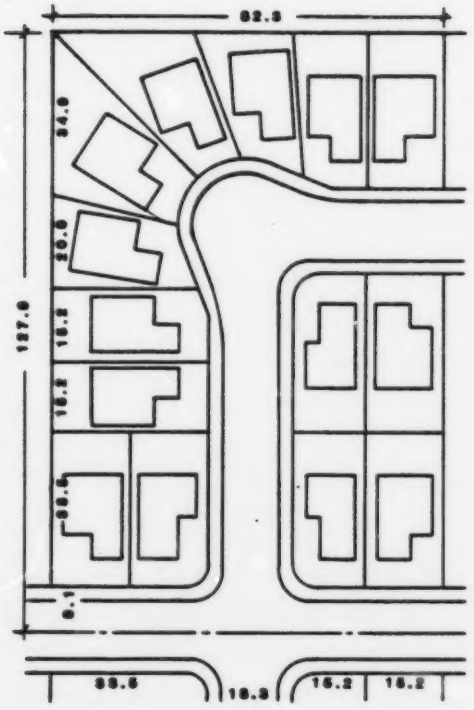
The Planning Department is also concerned about how to stimulate infill activity, the maintenance of converted houses, and recreational opportunities for infill residents. These issues are addressed in several recent documents and projects; the Redevelopment and Infill report, the proposed Maintenance Bylaw, and the NIA programs which have been undertaken in four inner city neighbourhoods. These activities will continue in an effort to achieve a more stable population base, which is consistent with good energy planning.

FIGURE 1
INNOVATIVE CUL-DE-SAC
DENSITY COMPARISON

Conventional

(Net residential density:
13.3 units/ha.–5.4 units/ac.)

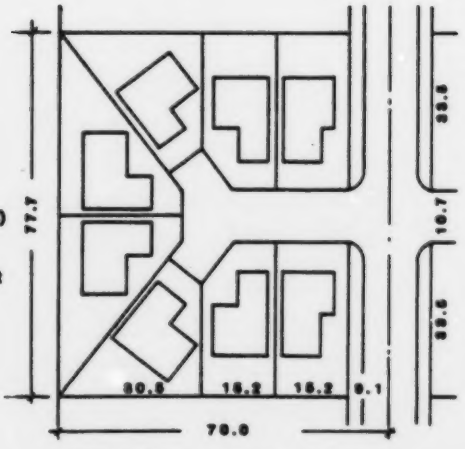
751.9 square metres per Lot



Innovative Cul-de-Sac

(Net residential density:
14.8 units/ha.–6.0 units/ac.)

679.9 square metres per Lot



NOTE: Distances shown are in metres

Revitalizing Inner City Neighbourhoods:

Several factors which have adversely affected the attractiveness of inner city neighbourhoods wer mentioned; school closures, reduced recreational services, traffic intrusions, and commercial and industrial encroachments. The Core Community Association and the Northeast Community Association expressed support for a strategy to reverse the decline of the neighbourhoods by addressing these factors.

Innovative Culs-de-Sac Design:

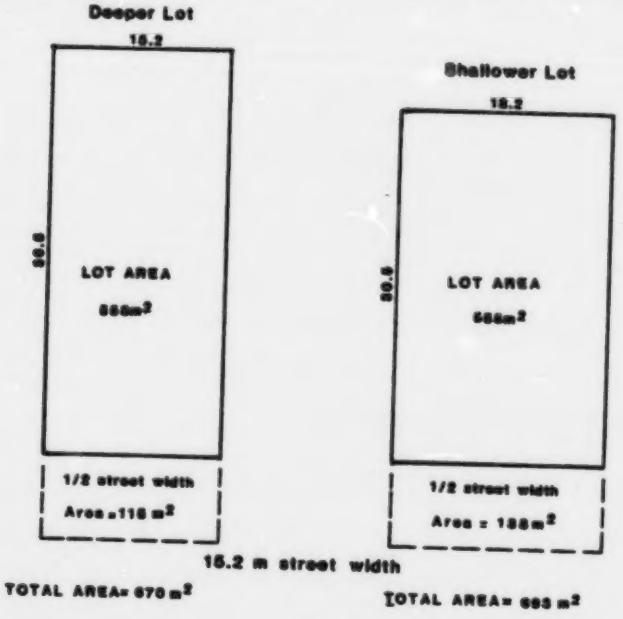
By reducing the amount of roadway in relation to the lots they serve, new types of narrow, short, culs-de-sac can increase the density of a development. The Public Works and Engineering Department expressed concern that design of culs-de-sac may cause problems for water distribution.

The Planning Department also opposes any designs which may cause significant servicing problems. The details of the design will require discussion between developers who wish to undertake developments involving innovative culs-de-sac designs and the Public Works and Engineering Department, notwithstanding any density and energy benefits which may be derived. The density benefits are illustrated in the attached Figure 1.

Storm Water Runoff:

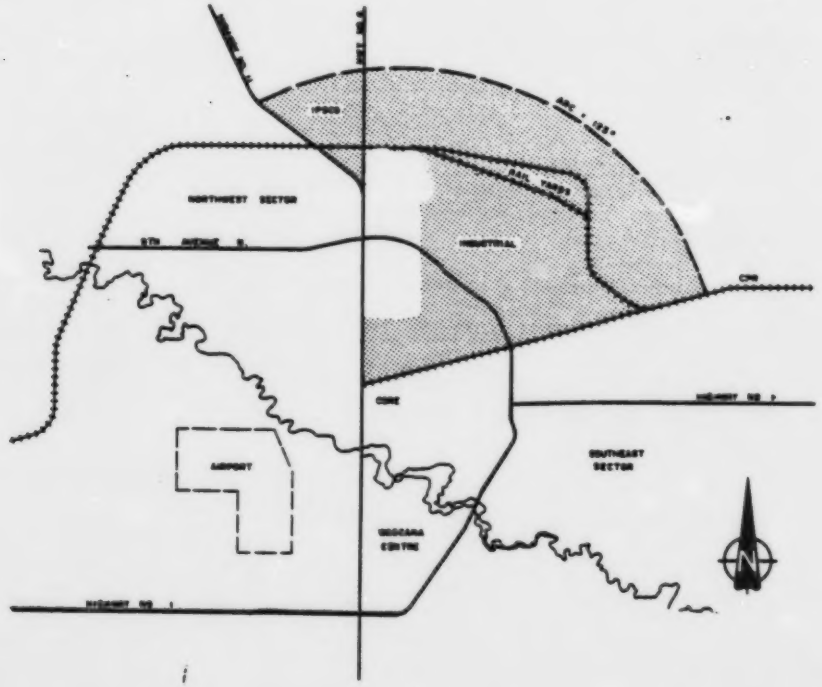
The Regina Public Works and Engineering Department notes that increases in density may alter overland storm water runoff. The Planning Department agrees that sufficient resources should be recovered from the development to provide for adequate underground services, whatever the density.

FIGURE 2 Comparison of Net Density Deeper Lot vs. Shallower Lot



DENSITY INCREASE FOR DEEPER LOT vs. SHALLOWER LOT: 3.46%

FIGURE 3: Arc of the Industrial Wedge



Deeper Lots:

Deeper lots can increase overall density as compared to shallower lots of the same size, by decreasing the amount of land taken up by roads to service the lot, as shown in the attached Figure 2. The Glencairn Community Association expressed concern that residents not feel "boxed in" by deeper, but narrower lots. The Planning Department notes that even fairly modest reductions to 15.2m (50 foot lots) from 18.2m (60 foot lots) can achieve an almost 3.5% increase in overall density. The "boxed in" feeling occurs when side yards are narrow irrespective of the total width of the lot, and should not be exacerbated as a result of prescribing deeper but narrower lots.

Urban Growth Patterns:

There are a number of factors which can be considered under this heading; among them, the long term growth of residential, industrial, and other districts, centricity of commercial activity, distribution of high density housing - in general, the basic form and shape of the city. From an energy viewpoint, the key is to maintain a compact urban form so that travel distances can be minimized. Land intended for industrial development is spreading over a large area in the north and northeast parts of the city, but the Glencairn Community Association expressed their concern that the proposal to limit the arc of the industrial wedge so that more housing could be accommodated in the area would cause industrial development to be redirected to other areas.

The Planning Department notes that the demand for residential land is outstripping the development of industrial land, and housing is forced further afield while more centrally located industrially designated land remains vacant. This is exacerbated when the land beyond the rail corridor is considered. The industrial "wedge" can be seen to extend from Highway No. 11 to the CPR Mainline, an arc of approximately 125^{o} as shown in Figure 3. In view of the above, the Planning Department would continue to urge that the long term direction of growth consider limiting the arc of the industrial wedge beyond the rail corridor to accommodate more residential development in a compact urban form.

2.3 MODAL CHOICE

It was pointed out in "The Opportunities for Conserving Energy" report that not all modes of travel are equally efficient in their use of energy. Methods identified in the report to stimulate greater use of the more energy efficient modes prompted comments regarding bicycle use, traffic flow improvements, and pedestrian commuter improvements.

Bicycle Use:

Comments on measures intended to increase bicycle use as a mode of travel were received from the Core and Glencairn Community Associations, the Public Works and Engineering Department, and the Regina Railway Relocation Office.

The community associations support bicycle improvements. Core proposed bicycle lanes on 12th and 14th Avenues through the Core neighbourhood, and Glencairn suggested more bicycle parking on City owned lots in the downtown core.

The Public Works and Engineering Department notes that there is limited opportunity to provide traffic widths for exclusive bicycle use, and the Railway Relocation Office sees little potential for bicycle paths other than on the abandoned CNR right-of-way.

In response to the above, the Planning Department agrees that exclusive bicycle paths, which are expensive and of questionable value from an energy viewpoint, should not be pursued other than in cases where their development can be easily accommodated (such as the CNR right-of-way) or there is another objective to be met (such as the Devonian Pathway). Other measures which accommodate bicyclists on the road system should be undertaken as the opportunities present themselves.

Traffic Flow:

Comments regarding measures to improve traffic flow and reduce energy wasteful stops and starts, were made by the Core Community Association and Public Works and Engineering. Core expressed its support for directing traffic onto through arterial roads instead of collectors, and specifically mentioned their support for the completion of the Glenavon Expressway/Saskatchewan Drive link into the downtown. Public Works and Engineering noted that many traffic improvements such as computerized signals have been undertaken.

Pedestrian Commuters:

Questions were raised by the Parks and Recreation Department as to whether the costs incurred in upgrading and maintaining landscaping on designated pedestrian routes to the downtown would result in greater pedestrian use. The Core Community Association noted that sidewalks in their neighbourhood are largely satisfactory, but problems often arise for pedestrians in crossing arterial roads.

The Planning Department would respond to the above by suggesting that any pedestrian improvements which are made pursuant to this report first be directed at improving crossing facilities at major arterial roadways. General upgrading and enhancement of sidewalks be undertaken only if benefits, in terms of greater pedestrian use, can be reasonably anticipated. In this regard, monitoring of pedestrian activity in the downtown, where street enhancement has been undertaken, may be instructive.

2.4 SOLAR ACCESS

Comments were made by HUDAC regarding potential for solar energy use. They substantiate the fact that significant heat energy savings can be achieved through the orientation of housing to allow for passive solar gains.

The Planning Department believes that solar orientation, while offering more limited savings than are possible through measures designed to promote a more compact urban form, can nevertheless form an important part of the overall energy strategy, and should be pursued as indicated in "The Opportunities for Conserving Energy".

3.0 REVISIONS TO "THE OPPORTUNITIES FOR CONSERVING ENERGY"

3.1 REVISIONS

Appendix "B" of this report consists of an amended version of the measures for conserving energy which were contained in "The Opportunities for Conserving Energy". The amendments reflect the comments received in response to the circulation of that report.

Deletions:

Deleted from the energy conservation measures are references to reducing road right-of-way width standards, reducing land dedicated for open space, and providing higher level landscaping along designated pedestrian walking routes to the downtown through inner city neighbourhoods.

Additions:

Additional discussion addresses maintaining good traffic flow, reallocating public reserve land for community or zone level parks, emphasizing more short local streets of 15m width, and improving pedestrian crossings at major arterial roadways in central areas.

3.2 APPLICATION TO THE PLANNING PROCESS

Energy conservation is an issue which is affected by many types of planning activities; among them, new subdivisions, inner city programs, land use strategies and transportation planning. The end product of this study is a set of measures which can be employed through various planning activities to improve the energy efficiency of the resulting development.

In order to recognize the energy conservation measures and ensure that they are taken into account in the planning process, it is appropriate to include the energy issue in the governing planning document - the Development Plan. Inclusion would be done in a manner which:

1. establishes energy conservation as an issue to be addressed through the planning process;

2. references the specific measures designed to enhance energy efficiency, as contained in Appendix "B" of this report; and,

3. ensures the appropriate implementation of the energy conservation measures through various planning activities.

The Development Plan which is now being reviewed by the Planning Department is intended to include a separate chapter on Energy Conservation. Other components of the plan such as land use and transportation should reflect a consistent position with regard to conserving energy. The Development Plan will be brought forward for Council's consideration following a public review process which is expected to occur through the remainder of 1986.

Until the Development Plan is adopted, the energy measures contained in Appendix "B" of this report can provide guidance in the review of subdivisions, the development of concept plans and formulation of the Development Plan.

APPENDIX "A"

COMPLETED TEXT OF BRIEFS SUBMITTED

Regina
Home Builders'
Association, Inc.

HUDAC

A member of the Canadian
Home Builders' Association

857 Arcola Avenue
Regina Sask S4N 0S9
Telephone (306) 569-2424

PLANNING DEPT.
DATE JAN 21 1986

DIR.
CUR. OP
POL.
SPEC. PROJ.
ADM. ASST.
FILE No. 5600 Energy

January 20, 1986

Mr. Peter C. Davies
Director of Planning
City of Regina
P.O. Box 1790
Regina, Saskatchewan
S4P 3C8

Dear Mr. Davies:

RE: ENERGY EFFICIENT COMMUNITY DEVELOPMENT INTERIM REPORT
THE OPPORTUNITIES FOR CONSERVING ENERGY
YOUR FILE 5600 ENERGY

Further to your letter of December 20th, 1985, we have had the opportunity to review the report and also have a meeting with Barry Braitman, of your department.

His report lays out basic energy concepts and energy saving solution possibilities. We are basically in acceptance to the comments contained in the above mentioned report.

In regards to developing proper sub division design, we feel much of this can be accomplished by trade-offs with the development community. Trade-offs such as reduced road widths and deleting sidewaks on one or both sides etc.; would encourage energy development design and our Association certainly would partake in discussions to develop such options in the overall development plan.

As you may be aware, our association has been very active with many levels of government, dealing with energy conservation in housing. We substantiate your departments' report that a major heat savings can occur through air tightness and passive solar gains in housing, even without specific sighting of the unit on lots, but certainly additional savings can be achieved by sub division design for appropriate passive solar gains.

Our Association has found that the energy crunch has substantially alleviated itself and public demand for Super Energy Efficient Housing has also substantially reduced. The initial crunch, however, did indeed force our industry into responding to consumer demand for upgraded insulation values and for increase air tightness in the dwelling structure.

Our Association believes that energy conserving methods only can move as fast as public demand to save energy proceeds. Certainly we offer our assistance, both from the land development and building community sectors of our association, to work with the city in providing optional opportunities to allow energy efficient community development to occur.

Yours truly,

K. A. McKinlay
Executive Director

KAM/js

c.c. Bob Peterson, Chairman
L/D Committee

Wayne Prokopetz, Chairman
Builder Committee

UNIVERSITY OF REGINA

FACULTY OF ENGINEERING REGINA, CANADA S4S 0A2

November 7, 1985

PLANNING DEPT.
DATE NOV 1 2 1985
DIR.
CUR. OP.
PCL
FILE No.

Mr. B. Braitman
Planning Department
9th Floor, City Hall
City of Regina,
P.O. Box 1790,
REGINA, Sask.
S4P 3C8

Dear Barry:

RE: ENERGY EFFICIENT COMMUNITY DEVELOPMENT INTERIM REPORT

The first interim report on energy efficient community development accomplishes the three objectives stated on page 2. You are to be commended for this effort.

Opportunities exist to effect energy conservation through land use planning. To this end, I am enclosing two articles, one that describes planning strategies, (many are contained in your report), and another that describes household energy conservation behaviour in Regina. I suggest that the highest potential for future energy savings will be by voluntary household initiatives and by energy planning for new residential developments. Our research program is directed to the latter.

A number of energy conserving initiatives in your report should be considered as policies in the new development plan; a few others have merit, but not for cold weather cities like Regina e.g. encourage walking to work, establish pedestrian commuter routes, also, a few other strategies such as reduce walking to bus stops must be further detailed so the reader has a clear understanding of how the strategy would be implemented. In this case, an increase in the number of bus stops in a residential area will also increase bus operation and maintenance cost and fuel consumption.

The next interim report will be difficult to research. Little information, we have discovered, exists in the literature on the B/C of energy conservation measures.

However, you might commence such a study, because of the paucity of quantitative results. I would be pleased to assist you in this endeavour.

Sincerely,

Fred Curtis

Fred Curtis, Professor
Executive Member,
Community Planning
Association of Canada

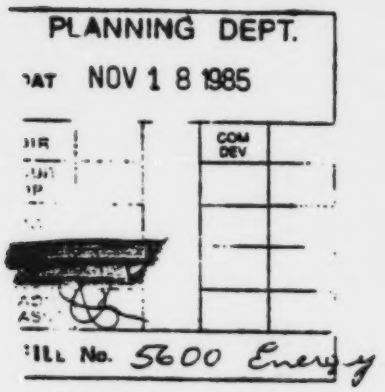
FC/plb

c.c. President, CPAC (Sask. Div.)

Bev Ollinger, Chairman
North East Comm. Assoc.
105 Toronto St. North
Regina, Sask.
S4R 2T4

November 13, 1985

Mr. Barry Braitman
Regina Planning Department
Box 1790
Regina, Sask.
S4P 3C8



Dear Mr. Braitman,

We wish you to know that our Association is very much in favour of trying to Rejuvenate the older areas of the City, this falls under both the Energy Efficient Community Development and the Housing Study we received.

Another point we feel strongly about is the need for more Senior Citizens Housing. We feel the Seniors are a very important part of our Community and certainly the City as a whole. Unfortunately the Seniors most in need are not always able to stand up for themselves and make their needs known.

Thank you for this opportunity to express our wishes.

Yours truly,

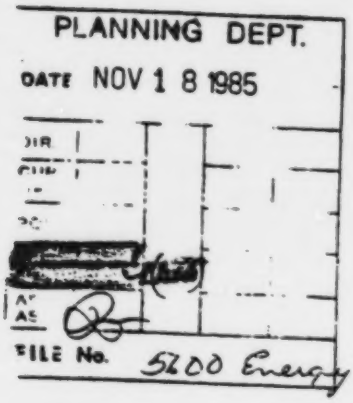
Bev Ollinger

Bev Ollinger, Chairman
cc: Randy Langgard

Uplands Community Association

87 Weekes Crescent, Regina, SK S4R 6Y1

November 13, 1985



Peter C. Davies
Director of Planning
City of Regina
Planning Department
P.O. Box 1790
Regina, SK
S4P 3C8

Dear Mr. Davies:

Re: Energy Efficient Community Development
Interim Report: The Opportunities for Conserving Energy

Thank you for the opportunity to read and respond to this interim report. Our comments are attached.

I look forward to receiving a copy of the second interim report scheduled for December which will discuss costs and benefits.

Yours truly,

Glynis Maley
President

hs

cc Dennis Trefiak, Chairman, North Zone Recreation Board

Response

of the

Uplands Community Association

to

Energy Efficient Community Development

Interim Report:

The Opportunities for Conserving Energy

Submitted by

Glynis Maley

November 13, 1985

General Comments

Energy efficient community development for Regina must consider the uniqueness of Regina as an urban centre. In comparison to most urban centres, Regina is small and compact. Its residents mainly come from a rural population where an automobile is a necessity of life.

Measures to encourage energy efficiency can only be successful if residents believe that they must conserve energy. While a development plan can build in conservation measures, public education is necessary to change attitudes.

Purpose

This first report provides a comprehensive list of opportunities to promote energy conservation through the planning development process.

The second report, along with evaluating the costs and benefits, should also rank the relative impact of each opportunity in respect to the other identified opportunities and the competing aspects of the planning process. This will be important to ensure that the new development plan recognizes and resolves conflicts between competing planning and development objectives.

Statistics

The energy statistics could be more illustrative. The data is presented as percentages of an undefined gross aggregate. The data would be more useful if presented as disaggregated real values. For example, what is the average annual consumption by a typical residence in Regina for electricity, natural gas and gasoline? What is the average annual cost

for each energy source in dollars and as a percentage of average annual income per residence? Transportation energy should be disaggregated by sector. Residential transportation consumption should be divided into work-related, recreation-related and goods/services-related consumption.

Comparative data from other similar Canadian urban centres would put energy consumption and costs in Regina in perspective.

Conserving Energy in the Work Trip, Shopping and Recreational Trips, Residential Space Conditioning

Many of the opportunities listed have merits for energy consumption but also provoked discussion in terms of personal preference. The second report must show the real value of these opportunities in order for decisions to be made.

Emphasis seems to be on higher density development. The possibility for a trade-off between high density and available use of land exists in Regina. Even if Regina reaches its predicted population growth, will we have the same development problems as other large urban centres?

Many urban centres do not have sufficient open space. This has been the experience in Regina in some of the older neighborhoods. Consideration must also be given as to how residents access open space, i.e. do they drive or ride their bikes?

Caution must be exercised in promoting air tightness of buildings. Recent experience with ureaformaldehyde has shown that health hazards are created if insufficient air movement occurs.

Conclusion

The characteristics of Regina provide an opportunity for unique and innovative planning and development. Yet, many of the identified oppor-

tunities seem to come from the problems and needs of large urban centres. The uniqueness of Regina must be considered to maximum advantage in preparing a new Development Plan for the City of Regina.

Glencairn Community Association
c/o 2633 Dewdney Avenue East
Regina, Saskatchewan
S4N 4P5

November 27, 1985

PLANNING DEPT.
DATE NOV 29 1985
DIR
CUR OP
POL
SPEC PRO
ADM ASS
FILE No. 5600 Energy

City of Regina
Planning Department
P.O. Box 1790
Regina, Saskatchewan
S4P 3C8

Attention: Mr. Peter C. Davies
Director of Planning

Dear Sir:

RE: Energy Efficient Community Development
- Interim Report: The Opportunities for Conserving Energy

In reply to your letter of October 18, 1985 and received on November 5, 1985, the Glencairn Community Association has read the above mentioned report and have a few suggestions for your consideration.

1) Getting businesses within the City of Regina to participate in conserving energy.
   - putting parking stalls aside for car pools of their employees or some kind of subsidization for using car pools.
   - for those employees unable to get into a car pool or no car at all, subsidize their use on the buses.

2) The City should look at bicycle parking. A secure area within the city owned parking lots (a couple of car stalls beside or near the parking lot attendant's building). We believe that more persons of our City would prefer this mode of transportation if they knew that their bikes were secured. A nominal fee of 25¢ per day can be charged or maybe more would come if the parking was free. The City of Regina would have to construct the bicycle racks, locate the racks each spring and fall,and a place to store the racks during the winter.

3) Our Association is opposed to reducing open space dedication and deeper lots. These areas of concern give the residents a sense of being boxed in.

4) An encouragement would be to build more taller apartment complexs in the downtown core area. Regina has to be one of the few cities that have very few apartments buildings in the downtown core. People would live downtown and can walk to work.

.....2

5) Our Association would like to see the continuation of the northeast part of the City as industrial. Housing should not surround this area since this would limit growth of our industrial area and the other areas will have industrial use spring up. This could mean zoning and other difficulties which delays in time and money for the City and communities.

These are our suggestions and would be happy to discuss them with your area if need be. I would ask that Mrs. Denise Wallin be contacted when setting up a meeting or questions to the above. She can be reached at 789-3877.

Yours truly,

GLENCAIRN COMMUNITY ASSOCIATION

Warne Rhoades.

Warne Rhoades,
President

c.c. Denise Wallin - Director of Zoning & Facilities
Bill Gray - Alderman, Ward 5

PLANNING DEPT.
DEC 30 1985
HR
SUP
POL
SPEC PROJ
ADM ASST
FILE No. 5600 Energy

Mr Peter Davies,
Director of Planning
City of Regina,
P.O. Box 1790
Regina, Sask.
S4P 3C8

Core Community Association

Dear Mr Davies:

Re: Energy Conservation Report

I am in receipt of your letter to Mr Harding of our Association, who has instructed me to forward our comments to the report as circulated:

Infill redevelopment of the inner-city is something that should not be undertaken in the absense of thorough analysis and public discussion. Still, the possibilities of improving the area through infill are very real. On top of all this, such redevelopment has obvious energy saving features which cannot go unnoticed in a time when energy costs are steadily eating away at the pocket-book of the average family. Unhappily, as a community group we are not sure who we might contact with respect to infill matters, since Sask Housing has taken on its new role as facilitator, rather than developer. If you have any suggestions, we would be pleased to hear them because insofar as we want to promote infill, we are concerned that it be sensitive infill.

With respect to revitalization of inner city neighbourhoods, you are aware that this goal is our raison d°etre. It has always been our position that improving the general appearance of the inner city will benefit the entire city from an aesthetic perspective, but as the report points out, it happens to make good economic sense! People can live in quite, safe and attractive residential neighbourhoods only minutes walking distance from their places of work. That kind of scenario exists for many of us who presently live in the Core, but it is in danger of being lost. The location of facilities such as the Core/Ritchie is unfortunate since this represented an opportunity for the City to create an exciting new recreation facility for the inner-city, encouraging people to move into the area and local residents to take advantage of it. Servicing the inner-city is simply essential to revitalization of it---notwithstanding the fact that trends show declining polulations in these areas. The report recommends attempts at reversing these trends, and we heartily concur.

Housing conversions are a difficult issue with us since many of the converted dwellings we have dealt with do not

represent a positive development for the area. I understand the report to recommend re-use of closed schools, warehouses etc. for higher density, residential redevelopment. There may be a great deal of merit in this, but we cannot condone without qualification the rezoning which would be necessary to accomodate widespread and drastic conversion of existing detached dwellings so that they end up as boarding-room style dwellings. The prospects of developing the vacated rail yards in high density residential units also presents hopeful options, but it also opens the door to high density slum planning. We could perhaps respond to that issue when matters become more clear.

The report recommends establishing direct home-to-office routes. For many of us in the Core, that route can be very direct by foot, or often by bicycle. Sidewalks in the area are largely satisfactory for pedestrians, but they conflict with major arterials. The report also recognises the need for cars to be able to get downtown fast and efficiently. When a pedestrian comes to the street, he should be able to cross safely, whether it be under, on or above the actual street surface. We recommend the City examine the idea of pedestrian cross-overs which will not impede vehicular traffic.

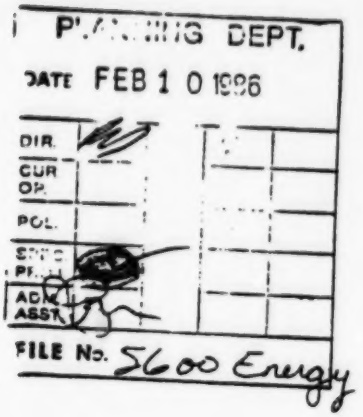
Lastly, it appears to us that bicycle lanes and parking facilities for bikes present an exciting addition to travel options. We are confident that a wider area of Regina residents would resort to walking or bicycling if it were safe and convenient. Putting bike lanes down 14th one way and 12th Ave the other would provide this option. Insofar as it would impede vehicular traffic, it is our view that the Sask Drive/ Glenavon Expressway concept would accomodate the vast majority of downtown to suburbs traffic and as such is an idea well overdue. It would provide a real benefit to those who live in Southeast Regina, as well as settling life in the inner-city. This project alone would accomplish many of the goals recommended in the report.

I thank you for having had the opportunity to provided input in this important matter. I trust that you will inform us of the outcome of your final report.

Sincerely yours,

W.E. (Bill) Gagnon

REGINA'S MARKET SQUARE



February 6, 1986

Mr. Peter Davies
Director of Planning
City of Regina
P.O. Box 1790
REGINA, SK
S4P 3C8

Dear Mr. Davies:

Re: Energy Efficient Community Development: Interim Report

The RMS Board of Management has reviewed the above captioned report and wishes to convey that it supports the directions anticipated in the report.

The Board would encourage continued study and the ultimate implementation of measures that would assist the community to conserve energy. The Board also indicated that it is prepared to assist your office, in any reasonable way, should its help be required in carrying out more of this type of useful work.

Thank you for soliciting the Board's views in this matter.

Best regards,

per

Lowell Monkhouse
Executive Director

LM/cft

206 - 2314 11th Avenue, Box 4733, Regina, Saskatchewan, Canada S4P 0K1 • Ph. (306) 522-6460
Downtown Business Improvement District

Saskatchewan

Saskatchewan
Energy and Mines

1914 Hamilton Street
Regina, Canada
S4P 4V4

Telex 071-2786
Telecopier (306) 787-7338

November 4, 1985

Mr. Peter C. Davies
Director of Planning
City of Regina
P.O. Box 1790
Regina, Saskatchewan
S4P 3C8

Dear Mr. Davies:

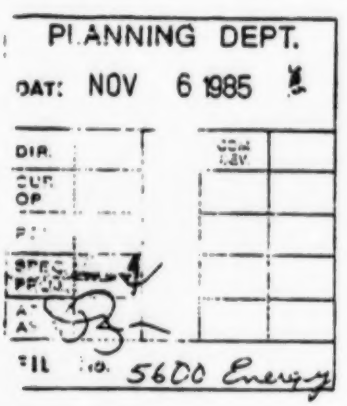
On behalf of Saskatchewan Energy and Mines, I would like to acknowledge receipt of the Energy Efficient Community Development interim report entitled "The Opportunities for Conserving Energy."

I would advise you that, at the present time, Energy and Mines will not be in a position to be able to review and comment on the report, but I would appreciate being kept advised of any further initiatives taken by the City of Regina in this area.

Yours truly,

for Floyd Gazdew

Floyd G. Wist
R,D&D Program Officer



Saskatchewan
HERITAGE
1985
Commemorating our Past, Building our Future

INTERDEPARTMENTAL CORRESPONDENCE

CITY OF REGINA

PLANNING DEPT.
DATE: NOV 1 3 1985

November 6, 1985

TO: Director of Planning

File: 4800-13

MGR			CLAN DEV
CUR			
POL			
SPEC PROJ			
ADM ASST			

FILE No. 5600 Energy

RE: Energy Efficient Community Development - Interim Report - The Opportunities for Conserving Energy

In response to your letter dated October 18, 1985, comments of this Department are provided herewith:

1. The higher density form of development utilizing small lots, zero lot line housing, narrow streets, etc. was tried in P.U.D. areas, but the market was not ready for this type of development.

2. Other than the common sense methods of energy conservation, many items are essentially trade-offs and traditionally the cost of energy depicts what is traded off, i.e. private auto versus transit. The City may try to lead the public in certain directions through incentives but until the market is ready, major changes will be difficult. Planning will have to be carefully carried out so that these changes can be accommodated at some time in the future.

3. Land dedicated for road right-of-way is already at a minimum and further reduction is discouraged.

4. Lewvan Drive also provides a key link to the downtown area from the northeast area of the City.

5. Emphasis is already being placed on improving traffic flow and reducing stops, particularly on the arterials.

6. There is very limited opportunity to provide traffic widths for exclusive bicycle use.

7. It is noted that reduced landscaped open spaces will also reduce energy use for maintenance and reduce need for water for irrigation.

8. Design of cul-de-sacs may cause problems for water distribution system.

9. The water utility has a substantial energy use for treating and pumping water. Landscape designs which minimize irrigation will save energy. Using night-time irrigation reduces peak demand and hence reduces energy costs.

....2/

10. It would seem that this report is about being cost-conscious when planning for expansion and/or upgrading of the Cities man-made environment. Saving money through energy efficient community development should be weighed against giving up benefits. However, who decides on the value of each? The true cost of rebuilding the City should recognize existing infrastructure needs to be assessed and possibly renewed and/or upgraded. For example, the combined sewer system in the old part of the City should be eliminated as new development results. Another example may be altering storm water run-off by increasing land use density. New street alignment could affect surface ponding. Therefore, sufficient recovery of underground services should be provided when redevelopment occurs to allow adequate level of service.

L. D. SCHNELL, Director
Public Works & Engineering

HEB/ck

INTERDEPARTMENTAL CORRESPONDENCE

CITY OF REGINA

Our File 8314.1.9

Your File 4800

January 8, 1986

To: Director of Planning

Re: Energy Efficient Community Development, Interim Report: The Opportunities for Conserving Energy

In reply to your correspondence of December 3, 1985 on the above noted project, this department has no comments on the report as forwarded. We would like to say, however, that this document seems quite comprehensive in addressing all areas of energy management as it relates to community development. We look forward to further developments on this item.

G. Colby Burns, Director
Buildings & Properties Dept.

RJE/mm

PLANNING DEPT.
DATE: JAN 15 1986
DIR.
COM DEV.
CUR OP.
POL
[redacted]
ADM ASST
FILE No. 5600 Energy

INTERDEPARTMENTAL CORRESPONDENCE

CITY OF REGINA

December 13, 1985
Your File: 4800
Our File: 4800/RPh-1.21a

TO: Mr. P. Davies, Director of Planning

RE: Energy Efficiency Community Development
Interim Report: The Opportunities for Conserving Energy.

The following are comments on the above report in the special interest areas requested in your letter of December 3, 1985:

3.1.4 Reuse Buildings

The last part of the last sentence referring to "the vacated railyards" should be deleted as it is intended to relocate or demolish most of the existing railway buildings on the relevant railway lands. The only exceptions are the VIA station, CP/CN Telecommunications, the Post Office, and possibly the CN roundhouse.

3.2.2 Express Busways

No comment.

3.2.7 Bicycle to Work

Other than the bicycle path on the CN right-of-way, I cannot rationalize sufficient benefits to offset the costs of the other suggestions.

E. Zsombor, Acting General Manager
Rail Relocation Office

EZ/ln

PLANNING DEPT.
DATE DEC 1 7 1985
DIR.
CUR. OP.
FILE No. 5600 Energy

APPENDIX "B"

REVISED ENERGY CONSERVATION MEASURES

Note: The following excerpts from "The Opportunities for Conserving Energy" represent the range of measures intended to conserve energy through land use planning, as amended to reflect comments received through the circulation and review process.

1.0 CONSERVING ENERGY IN THE WORK TRIP

The daily trip to and from work consumes a significant proportion of the total amount of energy used for transportation in urban areas. Several studies have shown that the work trips can consume as much as 80% of the energy used for urban transportation. Planning can have an influence on energy used in the work trip by minimizing average work trip lengths and by encouraging a shift to more efficient transportion modes.

1.1 Average Work Trip Lengths:

At the present time, approximately 82,000 Reginans work outside their homes. Although no precise information for Regina on work trip distances exists, one estimate based on the distribution of population and employment nodes in the city suggests that the average daily round trip length may be 13.5 km. As the city continues to grow in area and work places remain centralized in the downtown, industrial sector, and Wascana Park, it is inevitable that average work trip distances will increase as more and more residents are located further from their places of work. Planning can influence the rate at which average travel distances increase in four basic ways.

First, average travel distances can be reduced by encouraging a more compact urban form. This increases the likelihood that workers will live closer to their work places. A more compact urban form implies a higher density of development. Density can be increased in several ways such as reducing the proportion of land dedicated to roads and open space, discouraging "leapfrog" development which leaves intervening vacant lands, favoring the continued development of higher density housing forms such as townhouses, apartments, zero lot line housing and planned groups of dwellings, and by promoting infill redevelopment to make the best use of valuable inner city and older suburban areas in which the original building forms are becoming obsolete.

Second, average travel distances can be reduced by allocating different residential densities in such a way that the highest densities are located closest to the employment centres; in practical terms, in the area near the downtown and along arterial roads leading to the core. In this way, the greatest number of people are located as near as possible to their work place. At the present time, the census tracts near the downtown do have the highest densities, but the population of these areas has been declining. It is warranted from an energy efficiency viewpoint to attempt to reverse this trend by encouraging redevelopment of vacant infill sites at relatively high densities, while ensuring that the amenity of the neighbourhoods is enhanced to attract the needed population base. In new developing areas, the higher density development should be allocated on or near major arterial roads, especially those that lead to employment centres, at a point closest to the employment centre.

Third, average travel distances can be minimized by aligning roads such that they provide as direct a route as possible between the employee's residential "origin" and his work "destination". This applies on a large scale in the alignment of major arterial roads, and on a smaller scale in the design of local and collector streets within subdivisions. An indirect route can quite easily double the actual travel distance and consequent energy consumption.

Finally, employment areas can be located so as to minimize the average travel distance for employees. Although this appears to imply the development of many local employment nodes, it has been the experience of other municipalities that employees do not necessarily live close to their place of work. Consequently, the scattering of employment nodes may actually increase average work trip travel distances, especially where there is little traffic congestion, which would encourage employees to live closer to their work place.

There are a number of specific measures which can be considered in an effort to minimize average work trip lengths:

1.1.1 Avoid Leapfrog Development: The growth of the city should follow a logical progression from the centre outward, avoiding "leapfrog" development which leaves intervening vacant lands. This has been done for the most part in Regina, and is a policy which should be continued.

1.1.2 Develop Areas Closest to Core: New development should occur in the area closest to the core. Regina is developing a linear form on a northwest-southeast axis while industrial lands and the airport areas, which are closer to the core, remain undeveloped. Consideration could be given to limiting the arc of the industrial "wedge" and reviewing the long term location of the airport. The average work trip distance for residents living in these areas would be significantly less than for those living in areas which comprise a further extension of development to the southeast or northwest.

1.1.3 Increase Net Residential Densities: Net residential densities can be increased by encouraging smaller average lot size, more multi-family developments, or some combination of the two. This may be difficult to promote if such developments run counter to prevailing market trends, since there are costs associated with higher density (in terms of a decrease in some amenities) that are borne entirely by the individual owner, while the benefits (in terms of energy savings by reducing travel distances) accrue largely to the residents of future and further outlying developments. However, the Development Plan does contain policies relating to higher density for reasons other than energy savings, and it is worwhile to note that those policies are consistent with good energy practices.

1.1.4 Reuse Buildings: Adaptive reuse of underutilized warehouse and other buildings which have outlived their original purpose should be encouraged. Included in this strategy should be the redevelopment of closed schools and the vacated rail yards.

1.1.5 Eliminate Lanes: Rear lanes should generally be eliminated in new residential development as a means of increasing density.

1.1.6 Reduce Road Dedication: The proportion of land dedicated to roads could be reduced by careful design of subdivisions to minimize the length of road provided and to emphasize more short local streets of 15m width..

1.1.7 Innovative Culs-de-sac Designs: The innovative use of narrow culs-de-sac can increase residential densities while maintaining lot size, by reducing the amount of standard size frontage road needed to serve the lots.

1.1.8 Deeper Lots: Narrow, deeper lots should be favored over wider, shallower lots as a method of minimizing the amount of land dedicated to roads.

1.1.9 Allocation of Open Space: Consideration can be given to reallocating land dedicated to public reserves, and deferral or the provision of cash-in-lieu should be encouraged in cases where the land otherwise dedicated for local parks would be surplus to the actual needs of the area. This deferral or cash-in-lieu would allow for consolidation of land in community or zone level parks which do not have the same effect on the internal density of subdivisions as do local parks.

1.1.10 Higher Density Infill Development: Redevelopment of properties in older areas should generally achieve a higher density than was originally established, in recognition of the central location of these areas. Most inner city properties could, under the current zoning, be redeveloped at densities significantly higher than they are now, and this is seen as being positive from an energy viewpoint. However, care should be taken to ensure that higher densities are not achieved at the expense of neighbourhood amenity, as discussed in 1.11.

1.1.11 Revitalize Older Neighbourhoods: Older neighbourhoods have declined in population while most of the population growth has been accommodated in new development at the periphery of the city. A strategy to reverse this trend should consider the attractiveness of older areas to a range of demographic groups.

School closures, reduced recreational services, intrusion of new major traffic routes, and the encroachment of commercial and industrial development, serve to decrease the attractiveness of older neighbourhoods leading to a population decline and lower densities, thus acting counter to good energy practices.

1.1.12 Housing Conversions: One reason for the decline of population in older neighbourhoods is that housing forms have not kept pace with the change in the composition of families over time (smaller families including more single elderly). Large houses with few occupants can be converted to apartments in order to make better use of the space. Care should be taken in the maintenance of such converted houses, however, to ensure that the attractiveness of the neighbourhood is not adversely affected.

1.1.13 High Density Nodes: In new subdivisions, higher density nodes should be located in appropriate places near the periphery of the area to enhance access to arterial roads, and minimize traffic infiltration through the neighbourhood. The lowest densities of development should generally be located in those areas furthest from arterial roadways.

1.1.14 Apartments on Major Streets: Arterial commercial "strips" in Regina have generally been developed at low densities and contain exclusively commercial uses such as gas stations, restaurants, motels and shopping centres. However, properties on or near arterial roads, especially those leading to major employment centres, are desirable areas from an energy viewpoint in which to locate higher density residential development.

1.1.15 Short, Direct Work Trip Routes: The distance between home and work is affected by the directness of the route taken; the shortest trips being a relatively straight line, and longer trips involving more meandering routes. The motorist is constrained in his work trip route decision by the alignment of various types of roads (collectors, arterials) and thus care should be taken in the design of such work trip carrying roadways so that they proceed as directly as possibe from residential "origin" to employment centre "destinations". The south and east parts of Regina are particularly well served with arterial roadways which lead fairly directly to the major downtown employment area (Lewvan/Saskatchewan Drive, Albert Street, Wascana Parkway/Broad Street, Arcole Avenue/Saskatchewan Drive, and Victoria Avenue). The north and northwest areas have fewer choices of direct routes to the downtown (Albert Street, Broad Street, Dewdney Avenue) and those not living near these streets are forced to take a more indirect route, usually involving some backtracking such as on McCarthy Boulevard which "doglegs" away from the downtown rather than toward it. As a consequence, roads which are designed for lower traffic volumes but which happen to provide a more direct route (such as Sherwood Drive/Argyle Street North/Avonhurst) are burdened with high traffic volumes leading to energy wasteful traffic tieups and unncecessary stops and starts. Traffic planning should match the lines of desired travel, from work trip origins to destinations, with the appropriate alignment and classification of road.

1.1.16 Local Street Design: There are several ways in which the design of local crescents, culs-de-sac and P-loops can reduce travel distances. Where there is a choice, local streets should feed into major rather than minor collectors. Access should be at the point on the collector closest to the arterial road leading to the principal employment centre.

1.1.17 Keep Downtown the Major Employment Centre: The location of an employment centre has an obvious influence on travel distances for work trips. In its simplest form it can be readily seen that the provision of many scattered employment nodes make it possible for more residents to live closer to their work places than would be the case with a single, centralized employment node. However, there are several complications which make the situation less clear. Proximity to the work place has been found to be a relatively low factor in most peoples' decision as to where to live. This is even more apparent when more than one family member is working, as is increasingly the case. Consequently, employment centres will likely draw not only on the nearby population, but will have employees who live in all areas of the city. The downtown is the single most accessible location for the city as a whole, and is the appropriate location for businesses which draw on all areas of the city for their work force. Local employment nodes should generally accommodate only small scale operations.

1.2 Modal Choice in Work Trips:

There are several different modes by which commuters travel to work in Regina; car, bus, walking and bicycling are, in that order, the most significant ones.

Not all transportation modes are energy efficient in terms of their energy use. Walking and bycycling consume no energy (other than muscle power) while automobiles and buses consume substantial amounts of gasoline, which is the energy source most subject to rapid price increase and future shortages. The efficiency of cars and buses depends on many factors including engine technology, driving conditions, and number of occupants in the vehicle. Walking and cycling, the two "zero energy" modes, are for most Reginans unacceptable for work trips due to the distances travelled and lack of shelter from the weather. Consequently, the automobile and bus will undoubtedly remain the principal means of travel to work.

Planning measures can be introduced to achieve several objectives:

a) Improve the efficiency of buses by encouraging an increase in the number of occupants per bus and arranging land uses, development densities and roadways such that transit routes can be as simple, direct and effective as possible;

b) Ensure that automobiles are used as efficiently as possible by prescribing measures to encourage higher vehicle occupancy and improve traffic flow; and,

c) Encourage the greatest use of walking and bicycling as modes of transportation for work trips.

There are a number of specific measures which can be considered to achieve the above:

1.2.1 High Density Transit Corridors: The alignment of transit routes and the density of development permitted along such routes should be coordinated. The overall planning of neighbourhoods and the City should take into account the desirability of providing high density transit corridors which lead to the downtown and other major employment centres. A higher density of development along transit routes will help ensure that the service is well used, justifying a greater frequency of service, more convenience to transit patrons and a correspondingly greater use of transit as a work trip travel mode. The provision of transit service to dispersed low density areas could be de-emphasized, allowing established targets for ridership to be met on the more efficient routes along high density corridors. In this way, the energy wasteful movement of empty or near empty buses could be reduced.

1.2.2 Express Busways: The provision of express busways would allow for faster trips - a major incentive for increased ridership. Feeder access to the express route could be accommodated by separate bus routes circulating through neighbourhoods, express buses leaving the express route for a portion of their trip to circulate through neighbourhoods before completing their route, or non-transit feeder systems such as "kiss and ride" drop-offs or "park and ride" services at outlying shopping centres. An express bus corridor will be provided as part of the rail relocation program. If shown to be successful, other opportunities for providing express bus corridors could be considered.

1.2.3 Reduce Walking to Bus Stops: The actual time spent on the bus is only part of the overall trip time for transit patrons. A substantial portion of trip time is utilized walking to and from stops. Since transit ridership is very sensitive to trip time, it is worthwile to reduce the time spent walking to stops. Consideration should be given in the design of local streets in residential areas to provide sidewalks which are as direct as possible to bus stops. In addition to reducing the actual walking distances, it is equally important to reduce perceived walking distances by minimizing the number of turns and backtracking needed to reach the bus stop.

1.2.4 Improve Bus Waiting Comfort: A major disincentive for transit use is the relative inconvenience and discomfort associated with waiting at bus stops for the next bus to arrive. Passenger comfort can be increased by providing shelters (as is done at many stops) and by posting schedules at the stops in order to reassure patrons of the arrival time of their bus. New telecommunications technology, which enables patrons to determine the "real time" arrival of the next bus could be considered.

1.2.5 Promote Ride Sharing: A survey undertaken by the Planning Department in 1983 showed that half of downtown employees usually drive themselves to work each day, but only about 13% usually get a lift with someone else. On the average, only one vehicle in four has an occupant other than the driver. There is a tremendous potential for ride sharing to reduce work trip energy consumption by increasing the number of passengers per vehicle, and consequently reducing the number of vehicle miles travelled. Much of the impetus for encouraging ride sharing must come from such non-traditional planning sources as employers helping organize car pools or van pools, traffic control incentives such as permitting high occupancy vehicles to use the exclusive bus lanes during peak hours and introducing parking incentives such as preferred locations or reduced rates for high occupancy vehicles. Planning can influence low occupancy travel by addressing the supply of parking to restrict the availability of long term parking in the downtown. Care must be taken, however, to ensure that the short term parking supply (for shoppers) remains inadequate. Consideration can be given to turning over some parking now used as long term monthly rental space to short term hourly users. Employers may also consider providing bus passes instead of free employee parking.

1.2.6 Improve Traffic Flow: Automobile operation can be made more energy efficient by facilitating trips at uniform moderate speeds with few stops. The use of arterial roadways which can accommodate large numbers of vehicles at relatively high speeds with few stops should be encouraged for work trips. Slower moving local and collector streets should not provide a through route alternative to arterials. Emphasis should be placed on maintaining good traffic flow on arterial streets by minimizing the number of stops and eliminating bottlenecks. It should also be noted that the higher vehicle occupancy and resultingly fewer vehicles on the road, as discussed in 1.2.5, can help to reduce congestion and thus permit the more efficient operation of vehicles. Staggering work hours, although not within the purview of planning, is nevertheless worth mentioning as a way in which peak traffic congestion can be significantly reduced or eliminated.

1.2.7 Bicycle to Work: Climate virtually prohibits bicycle use for work trips during the four of five winter months each year, but it is a possible travel mode during the remainder of the year. A survey of bicycle riders conducted by the Planning Department in July, 1982 showed that the major concerns of bicyclists include lack of suitable bicycle paths or routes, lack of secure bicycle racks, and physical hazards such as bridges and railway tracks. The survey also showed that almost 75% of bicycle trips to the downtown are work trips, more than 84% of those cyclists are twenty years of age or older (almost 40% are over thirty years old) and almost 85% travel more than two miles to the downtown (almost 70% travel more than three miles). These figures suggest that bicycle use may be made viable to a substantial proportion of downtown commuters during seven months of the year if the concerns noted above can be effectively addressed. The City could undertake physical improvements to facilitate bicycle commuting including widening of curb lanes where feasible, modification of bottlenecks, upgrading street resurfacing on designated routes, providing improved signage, and considering the incorporation of a bicycle path into the busway proposed on the abandoned CNR right-of-way.

1.2.8 Bicycle Parking: A special concern of bicyclists is the adequacy and security of parking, especially in the downtown. The newly adopted Downtown Plan, which suggests that bicycle parking be encouraged in the downtown for bicycle commuters, would help to resolve this concern.

1.2.9 Walking to Work: Distance and climate constrains most Reginans from walking to work downtown - only about 11% of Regina residents live within comfortable walking distance of the downtown, and this proportion is declining as the process of suburbanization continues. The potential for nearby residents to walk downtown, however, is high. Half of all employees who live in the Transitional area walk to work (some portion of the

remainder do not walk because they work in Ross Industrial Park, University of Regina or other outlying employment centres). A strategy to promote residential development within walking distance of the downtown would provide greater opportunity for more people to walk to work, and is also consistent with the density considerations discussed in Sections 1.1.10 to 1.1.12.

1.2.10 Walking Routes: Consideration could be given to identifying "pedestrian commuter" routes to the downtown through inner city neighbourhoods, and improved crossing facilities at major arterial roadways be considered.

1.2.11 Telecommunications: New telecommunications technology is making it possible for more and more work to be done from the home. Since a great deal of energy is expended in moving the individual to his work place, and very little energy is needed to move the ideas or information that is very often the essence of the individual's work, telecommunications can be seen as perhaps the ultimate in energy efficient work trip modes. The implications on activity patterns, social relationships and land use and building form may be profound, and should be examined in some detail so that they may be anticipated and planned for accordingly.

2.0 CONSERVING ENERGY IN SHOPPING AND RECREATIONAL TRIPS

Shopping and recreation trips consume most of the energy used for personal transportation aside from work trips. In spite of Regina's relatively small size it appears that an inordinate amount of energy is used in these trips, resulting in a total transportation energy usage level which is high, as described in Section 2.1 of "The Opportunities for Conserving Energy". Energy used in shopping and recreational trips can be minimized through planning activity in two basic ways.

First, land uses can be allocated in a manner which facilitates combined trips at a single destination - for example, a shopping mall with medical offices and a library. In this way, energy wasteful trips from one destination to another are reduced.

Second, planning can encourage the use of more energy efficient transportation modes. Shopping and recreational uses in neighbourhoods can be located to maximize the number of residents who live within walking distance, and pedestrian routes to neighbourhood facilities can be enhanced to encourage residents to walk rather than drive. Larger neighbourhood or district scale facilities can be located on transit routes to provide an alternative to automobile use for these relatively frequent but short trips.

2.1 Combined Trips

Significant energy savings can be achieved by encouraging combined shopping and/or recreational trips at a single destination which is conveniently reached. Research recently completed in Ottawa suggests the following measures:

2.1.1 Walk to Neighbourhood "Cluster": Local clusters within walking or cycling distance of their "markets" may consist of a church, confectionery store or pharmacy and park/school.

2.1.2 "One Stop "District Centres": Community and district centres serving between 15,000-60,000 persons can combine shopping facilities, banks, medical services, restaurants and compatible employment opportunities such as professional offices.

2.1.3 Highest Order Shopping Downtown: The downtown should provide a complex that serves the inner city for basic needs, and the entire city and region for specialized needs. Uses should include a full range of shopping facilities from the least to most specialized, work places, banks, theatres, concert halls and other cultural facilities, moving, night clubs, restaurants and markets.

2.2 Modal Choice

There are several measures which can be considered in order to facilitate the use of more energy efficient modes of transportation for shopping and recreational trips:

2.2.1 Centrally Located Neighbourhood Facilities: Neighbourhood shopping and recreation facilities such as parks and local shopping should be located in a manner which maximizes the number of area residents who are within comfortable walking or cycling distance.

2..2.2 Walkways to Stores, Parks:

Sidewalks should provide a direct route for area residents to walk to neighbourhood shopping and recreation facilities.

2.2.3 Walking Comfort: Pedestrian pathways to neighbourhood shopping and recreational facilities should be made comfortable to use by considering appropriate levels of lighting, traffic controls at street crossings, and minimizing the number of turns.

2.2.4 Bus Service to Shops: Neighbourhood shopping and recreational facilities, and especially the larger district or regional shopping and recreational facilities that serve the higher order needs of several neighbourhoods, should be located on bus routes that circulate through the areas which they are intended to serve.

3.0 CONSERVING ENERGY IN RESIDENTIAL SPACE CONDITIONING

Residential space conditioning is a term which includes both home heating and cooling. The residential sector consumes about one-third of the energy used in Regina, most of which goes for space conditioning. Given our climatic extremes, it is not surprising that the approximately 27% of Regina's total energy used for home heating and cooling is well above the 16% of total energy which a typical Canadian city uses for the same purpose. Many cities have focused their efforts in conserving energy on measures aimed at residential space conditioning, for two basic reasons:

1) the savings can be significant
2) many of the measures are relatively easy and inexpensive to implement.

It should be noted, however, that the greatest energy savings in residential space conditioning involves measures which lie largely outside the scope of planning - increasing insulation, improving air tightness, installing night setback thermostats, maintaining furnace condition etc. These types of measures can have a dramatic effect on reducing residential energy consumption, meaning that the planning measures can influence a correspondingly smaller share of energy savings in this area. A recent study in Lethbridge showed that, in an area which has a similar climate to Regina, planning measures such as solar orientation can influence energy savings of 6% per year, but the non-planning measures can save 60 - 65% per year. The report goes on to state that "in a well insulated and airtight home, the sun may provide up to 25% of the home heating requirements, but the energy required to heat the house in the first place is so low that the cost savings may only amount to a few dollars per year." Nevertheless, solar orientation is of some benefit as long as the considerations of density, transit efficiency and other transportation related measures are not sacrificed in achieving it. As the Lethbridge report concludes, "In the long term, high fuel costs may make even small savings from solar orientation important."

Solar orientation is one, perhaps the most important, measure among several which are available through planning activity to achieve energy savings in new developments. Other measures concentrate on reducing heat loss, directed primarily at the bulk of buildings and landscaping.

3.1 Solar Heat Gains

Direct utilization of the sun's energy for home heating is a simple and practical way of reducing the demand placed on gas or electrical energy sources. The two basic elements in utilizing solar heat are orienting lots so that houses may be constructed with predominantly south facing windows, and protecting solar access by restricting overshadowing from other buildings. It is almost as important to restrict solar heat gains in the summer months, in order to reduce energy used for air conditioning. The following measures are intended to achieve a more effective utilization of solar heat:

3.1.1 North-South Oriented Lots: New subdivisions should provide for as many lots as possible to be oriented on a north-south axis. The simple expedient of providing south facing windows can reduce heating costs considerably by utilizing the sun's energy directly in heating the home. Research undertaken in Brampton, Ontario suggests that a divergence of 12 to 15 degrees from a true north-south orientation is an acceptable range for effective solar orientation. Development undertaken on flat terrain with few design constraints can reasonably be expected to achieve 80% or more of lots oriented within 15 degrees of north-south. This can be a target for future developments in areas where concept plans have not been approved (concept plans may impose design constraints which make 80% solar orientation difficult to achieve; and thus care should be taken in future concept plans to avoid such constraints). In areas where

existing development of concept plans are in place, no specific targets can be assigned, but experience in reviewing subdivision plans in Regina has shown that 60% to 80% solar orientation can very often be achieved by careful design of local streets and lots.

3.1.2 North-South Oriented Houses: Where north-south orientation of lots is not possible, it may still be possible to site a house to maximize solar heat gain by skewing it on the lot. Relaxations of side yards which may be necessary to accommodate such a measure should be considered as part of the zoning regulations.

3.1.3 Houses on Slopes: Lots on east or west slopes can permit (perhaps even benefit from) divergence from a north-south orientation. On east slopes, streets should run southeast-northwest, while on west slopes, streets should run southwest-northeast. This minimizes the overshadowing of houses on each other.

3.1.4 Deeper Lots: The provision of narrower, deeper lots increases the separation between rows of houses, thus reducing overshadowing. This measure is also consistent with increasing density as described in Section 1.1.8.

3.1.5 Solar Access: Consideration could be given to prescribing solar building "envelopes", the area within which building may occur without overshadowing neighbouring properties.

3.1.6 Uniform Setbacks: Uniform setback of houses will reduce overshadowing of one on the other.

3.1.7 South Facing Windows: Although not within traditional planning jurisdiction, consideration could be given to ways in which south facing windows on houses can be encouraged. In conjunction with the above, appropriate overhangs or awnings

should be provided to shield south windows from summer sun. (This occurs since the sun is much higher in the sky during the summer. West windows, those that absorb most solar heat gains in the summertime, but not in the winter, should be minimized.

3.1.8 Active Solar Systems: Given the present level of technology, active solar systems (photovoltaic panels or hot water systems) have not proven economical in the Regina context. However, as technology improves and traditional energy sources increase in real cost, active systems may become more practical, and possible zoning impediments to their use should be reviewed.

3.2 External Heat Loss

The fact that buildings lose heat to the outside through walls and roofs is the reason that heating systems are required. In a perfectly insulated house, all of the heating needs could be met through incidental heat sources such as lights, refrigerator motors, stoves, etc. Consequently, reducing external heat loss can have a profound impact upon the energy needed specifically for heating and could theoretically be reduced to zero (as has been done in some "superinsulated" demonstration houses). Most of the measures for reducing external heat loss lie outside the scope of planning; insulation, air tightness, etc. There are however, several planning measures which can influence heat loss, as discussed below:

3.2.1 Wind Protection: Winds increase the rate of heat loss from the external shell of buildings. By orienting houses 45 degrees to the prevailing winds, resulting heat loss can be reduced by one-half to one-third. The predominant winter wind in Regina is from the northwest, and the secondary wind is from the southeast. Consequently, houses should be oriented on a north-south axis, which ties in with the passive solar heat gain measures described in Section 3.1.

3.2.2 Reduce Outside Walls, Roof Area: Heat is lost primarily through external surface areas - walls and roof. Consequently, a reduction in the external surface area in relation to the internal floor area can achieve greater energy savings by reducing heat loss. This can be achieved by promoting two storey, semi-detached, and townhouse units, which have less outside surface area than a bungalow of the same floor area. The actual energy savings however, would be negligible in airtight superinsulated houses since external heat loss would thus already be minimized.

3.2.3 Insulation: New houses are built to much higher insulation standards than is generally the case for existing housing, especially those of older vintage. Housing built from now on may account for one-third of the housing stock Regina will have in 2001, but that still leaves two-thirds of its housing stock which will predate 1985 and be of varying quality in terms of its insulation levels. The City administered Residential Rehabilitation Assistance Program (RRAP) which provides funds for homeowners to upgrade their properties in designated areas, is one vehicle whereby improved weatherstripping, storm windows and doors, etc., can be promoted to reduce heat loss from older houses. The senior levels of Government and Saskatchewan Power Corporation can also be encouraged to maintain and enhance their programs directed at improving the energy efficiency of existing housing.

3.2.4 Landscaping: Trees can be used effectively to screen wind and provide shade as needed. Planting coniferous trees on the north and west sides of houses will block the cold winter winds - the conifers on the west side will also shade summer sun to minimize heat gains during that season. Deciduous trees on the south side will permit sunlight penetration during the winter, and shade during the summer. Landscaping can now be regulated through zoning under the provisions of the Planning and Development Act, 1983.